



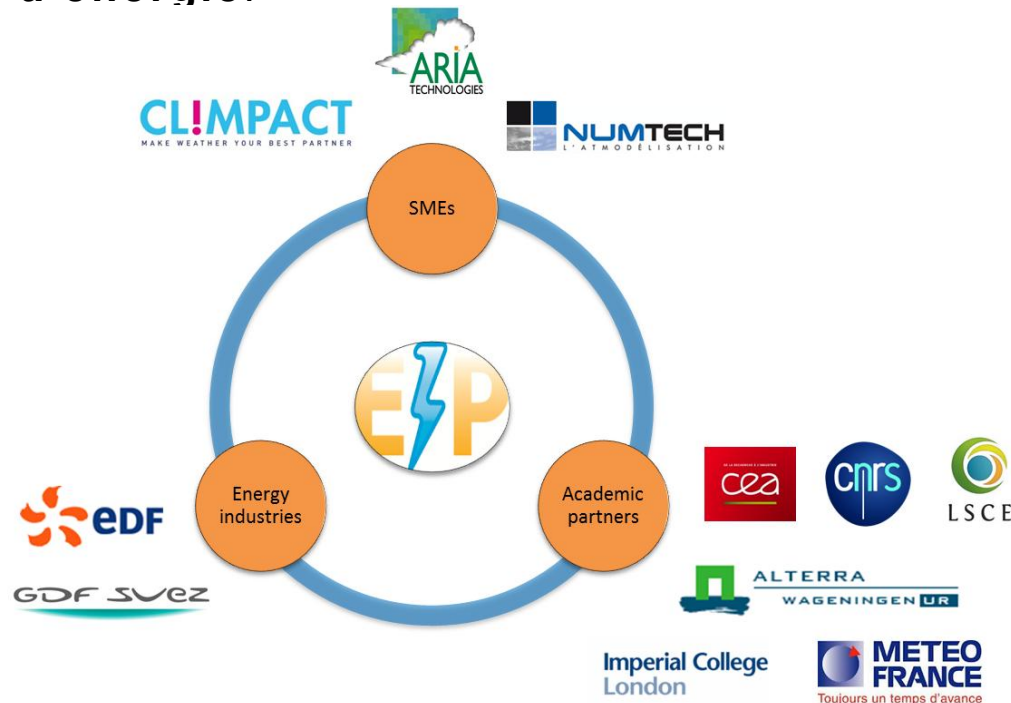
Extreme Events for Energy Providers

E3P aims at filling a gap between climate science and its practical use in the energy sector, and creating in turn favorable conditions for new business opportunities.

Fanny VELAY-LASRY , Céline DEANDREIS

Objectif

- E3P rassemble scientifiques, PME et industriels autour d'une même table
- L'étude: **les extrêmes climatiques** (vagues de chaleur, de froid, sécheresse, tempêtes) qui provoquent des pics de demande et affectent la **production d'énergie**.



L'étude de marché

ARIA
Technologies

CLIMPACT

NUMTECH

Questionnaire:

- sent to Energy, insurance, re-insurance, water, construction sectors
- ~54 industries/groups listed over 10 countries



Bridging climate science and the energy sector to better anticipate future risks while fostering business opportunities

Extreme Events for Energy Providers

E3P

Consortium
E3P is a project of the Knowledge and Innovation Community (KIC-Climate). The academic partners are international leaders in climate science and studies on climate extremes. In its starting configuration, the consortium is composed of:

- **Academic partners:** LSCE (IPSL, CEA-CNRS-UVSQ, France), Imperial College (London, UK), Météo-France, Wageningen University (NL)
- **Industrial partners:** EDF, GDF SUEZ
- **SMEs:** ARIA Technologies, CLIMPACT and Numtech.

Deliverables

- The project will develop computer products (software, maps, data) in a generic format.
- Professional and student training on climate extremes and their impacts will be proposed.

Those deliverables are the corner stones of climate services, and will be focused on extreme climate events.

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L'étude de marché

- **Résultats:**

- **Wind speed** for distribution sector, **Sea level** increase for nuclear power plant, **flood**
- The energy providers don't seem to be **not very interested in future climate**.
- But they are **interested in seasonal forecast**.

Climate is not a big issue as long as the operators are covered by the insurances and they respect the quotas fixed by the State (ex: percentage of days of privation of electricity supply)

- **Réorienter le projet:**

- Sensibiliser le public et les fournisseurs d'énergie
- Réaliser des prévisions à moyen terme

Les produits

- **Les indices** préconisés par les grands groupes industriels pour caractériser les vagues de froid

Temperature (tas):

Number of days with temperature below -11 C
 Number of days with temperature below 0 C
 Number of days with temperature beyond 22.5 C
 Number of days with temperature beyond 30 C
 Number of days with temperature beyond 35 C
 Seasonal Mean (JJM, AMJ, JAS, OND)

Monthly Mean

Wintear Mean (NDJFM)

X% quantile of the winter mean temperature (NDJFM)

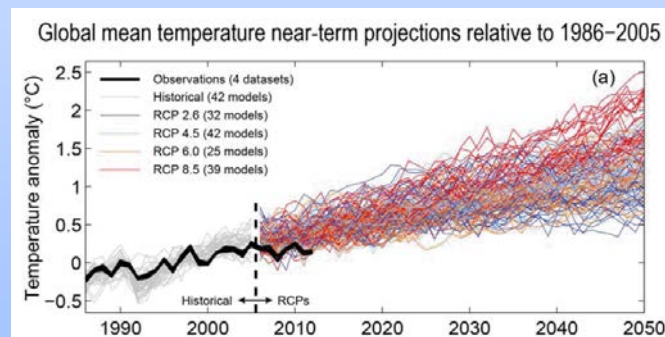
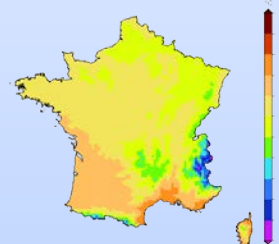
Daily Minimum Temperature (tasmin):

Number of days with tasmin below 0 C

Daily Maximum Temperature (tasmax):

Number of days with tasmax beyond 40 C

- **Chaîne de traitement** des bases de données ENSEMBLES, CORDEX, DRIAS, CMIP5 pour calculer les indices

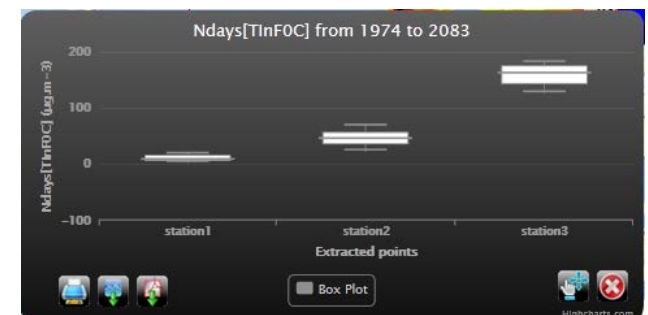
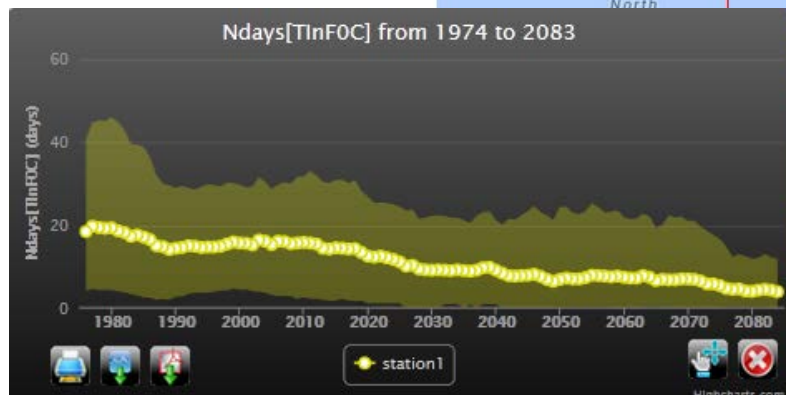
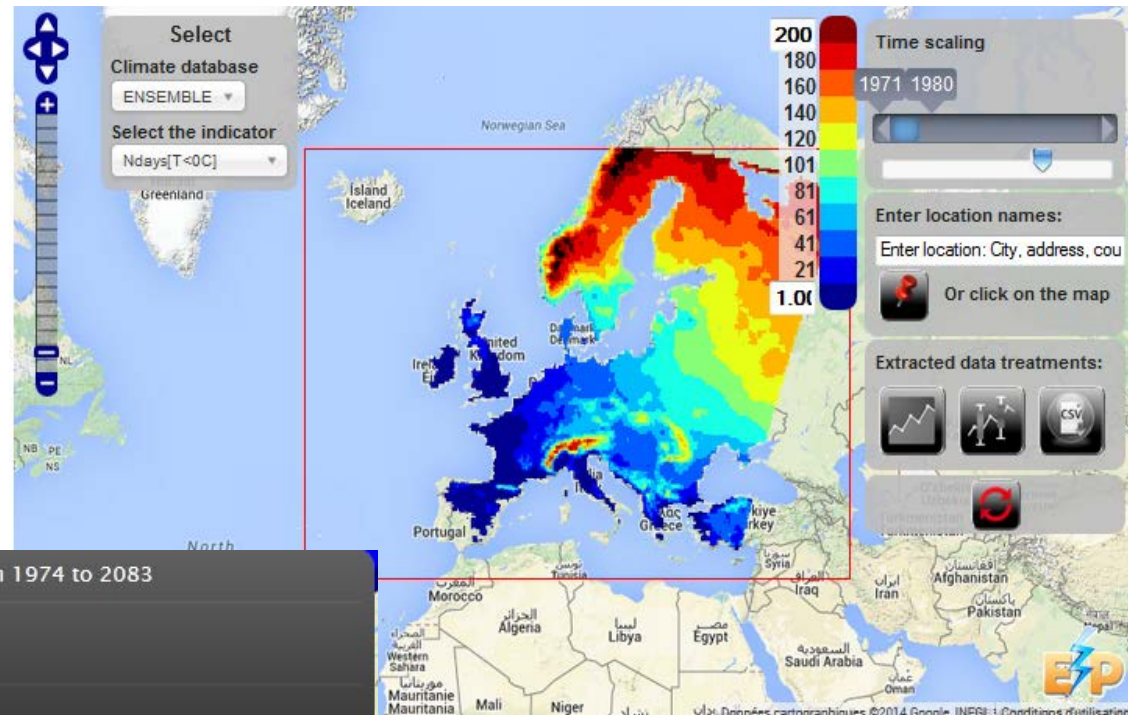


Les produits

E3Pviz tool: an attractive way to provide interesting information on the future climate

- ENSEMBLES database and EURO-CORDEX (coming soon)
- Temperature, Wind and Precipitation indicators
- Maps, Time series, box plot...
- Free subscription to the website for an access to the expert version

<http://web.aria.fr/creator/E3P/index.php>

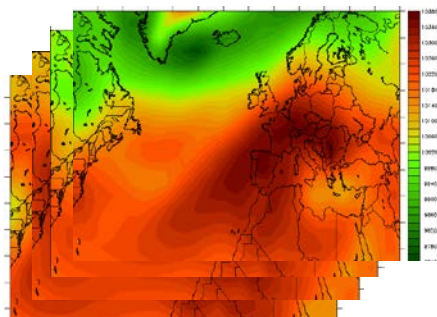


Les produits

AnaWEGE (Yiou 2015)

20-years learning database

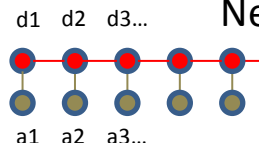
Daily sea Level Pressure



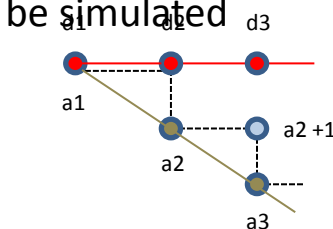
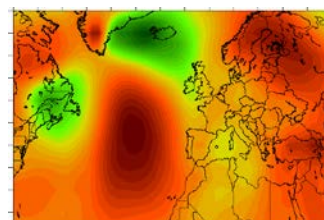
Daily climate variables

- variables: Tmin, Tmax, Tmean, wind, precip
- univariate or multi-variate
- Single station, multi-station or gridded data

New sequence of data to be simulated



Circulation map of
d1, d2, d3...

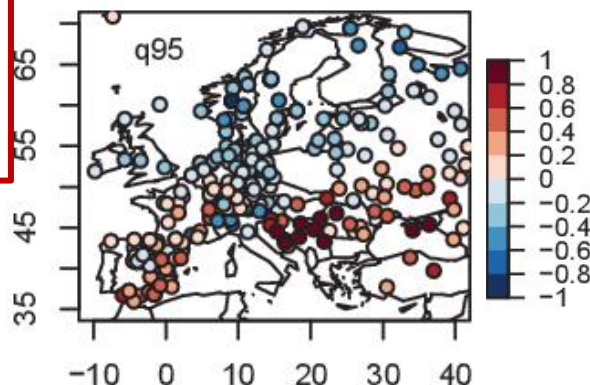


Circulation map
of d2, a2+1...

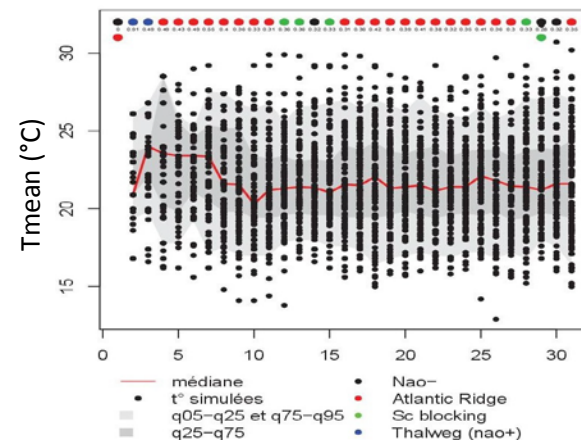
Analog selection from the
database + association of
climate variable(s)

Simulation of 500 summers

Error on q95 Tmean anomalies (°C)



Forecast – days since 2015/6/26



Merci de votre attention!

<http://web.aria.fr/creator/E3P/index.php>

